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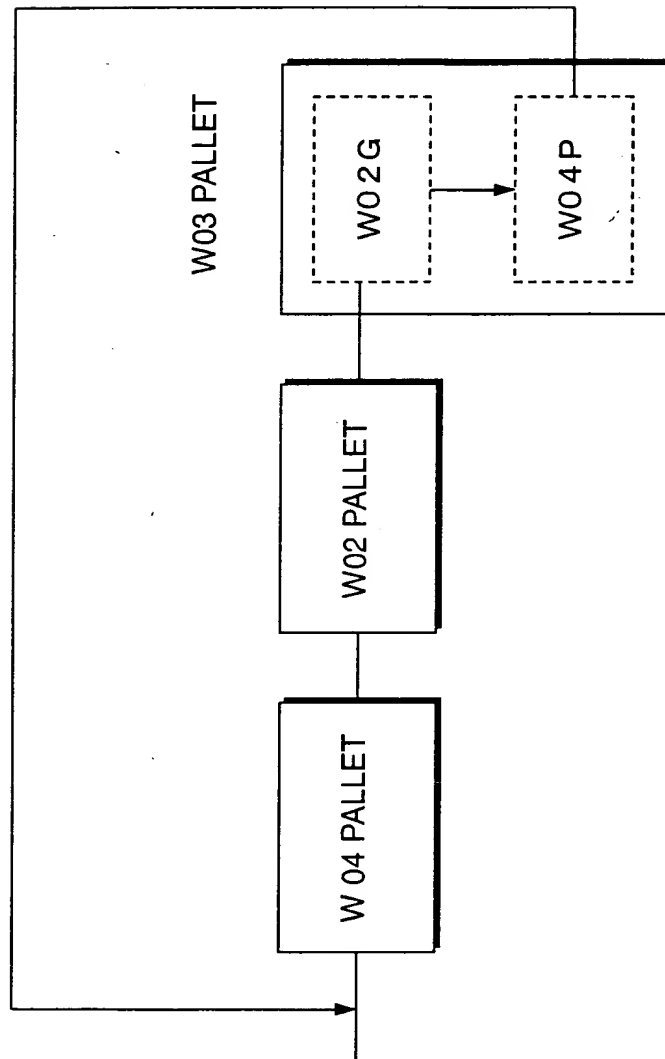
Fig. 1

Fig. 2

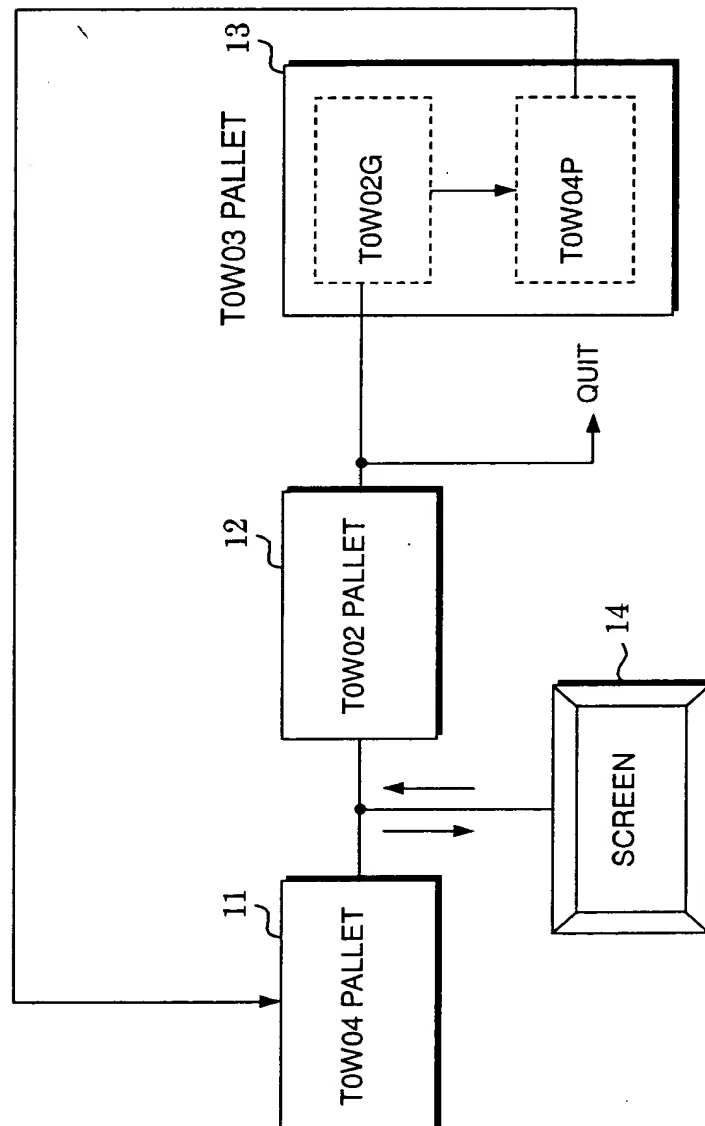


FIG. 2

Fig. 3

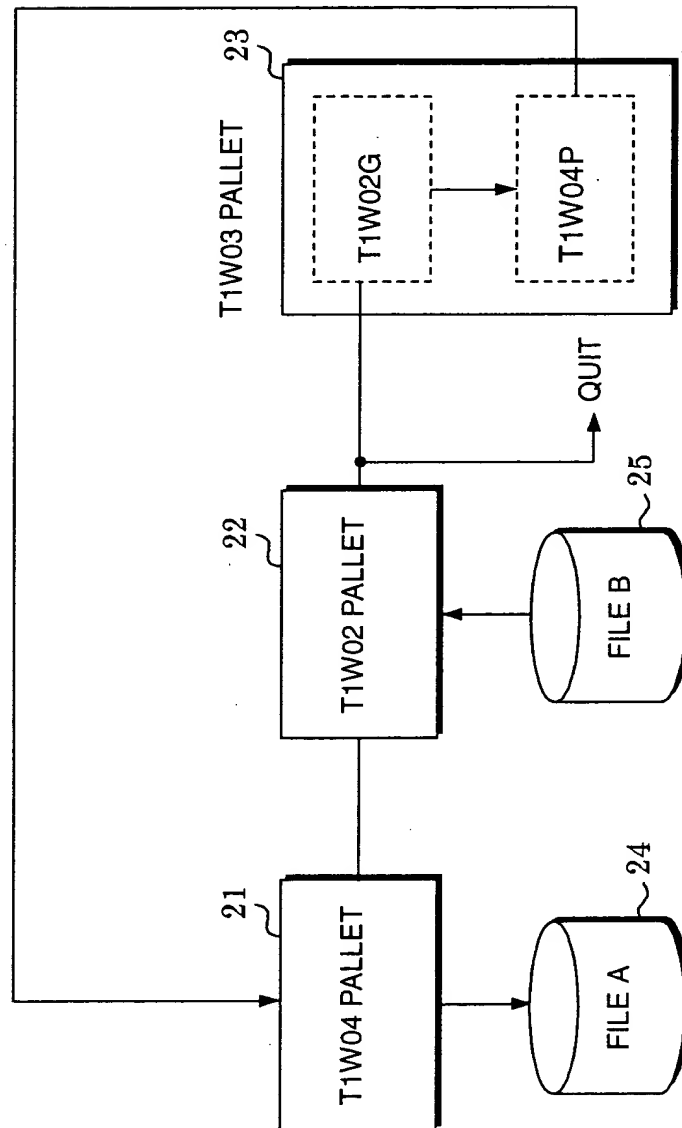
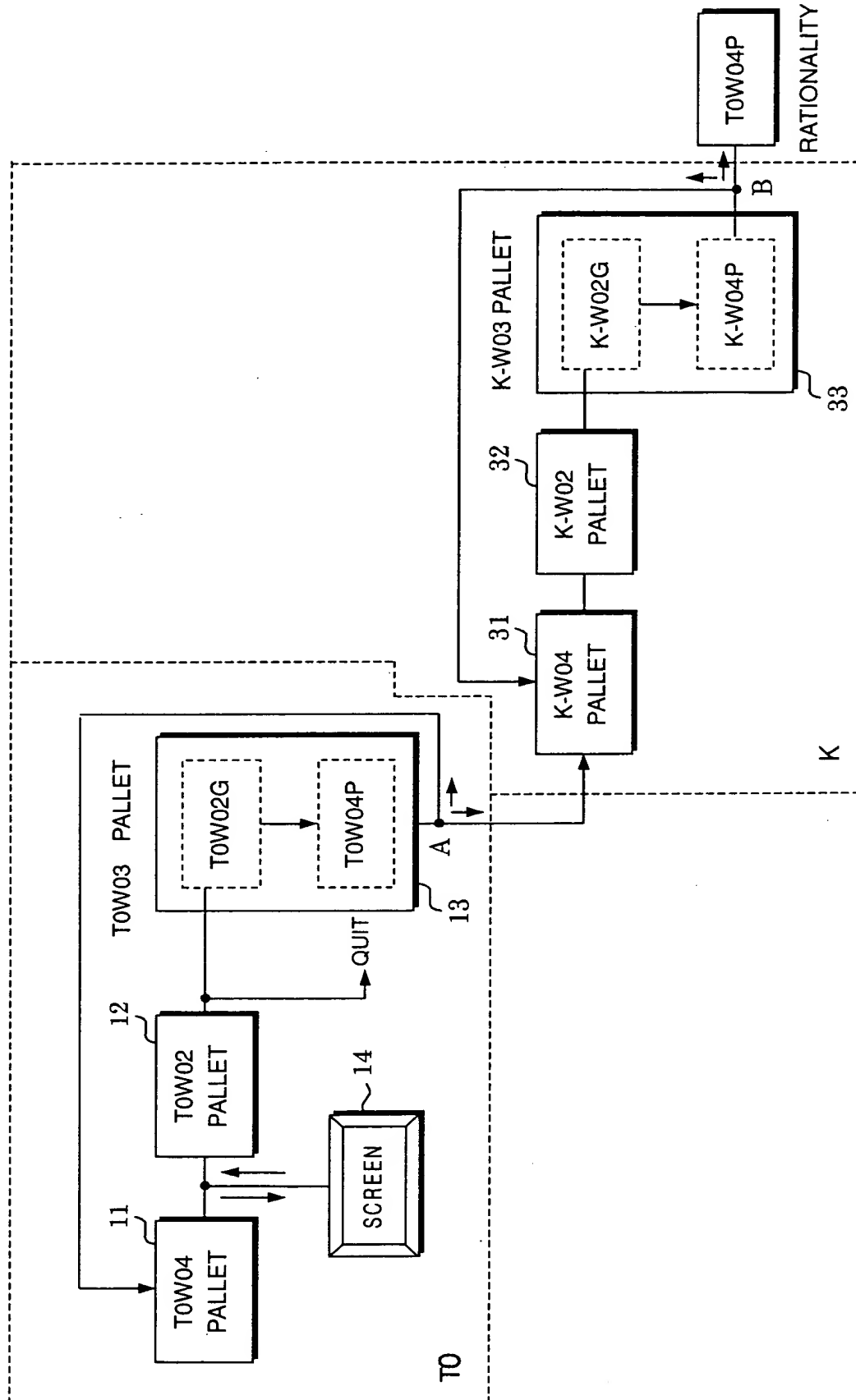
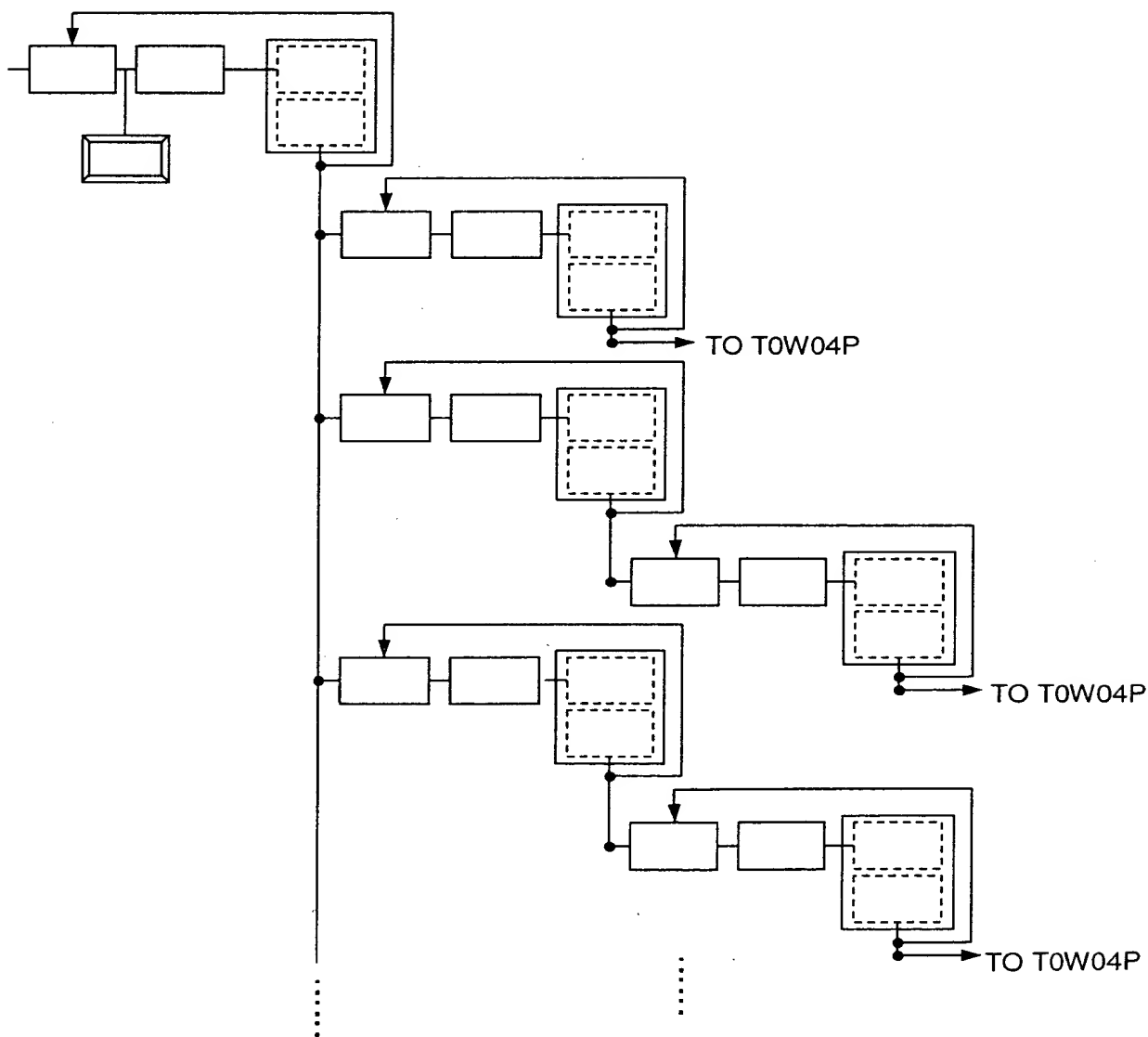


Fig. 4



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Fig. 5



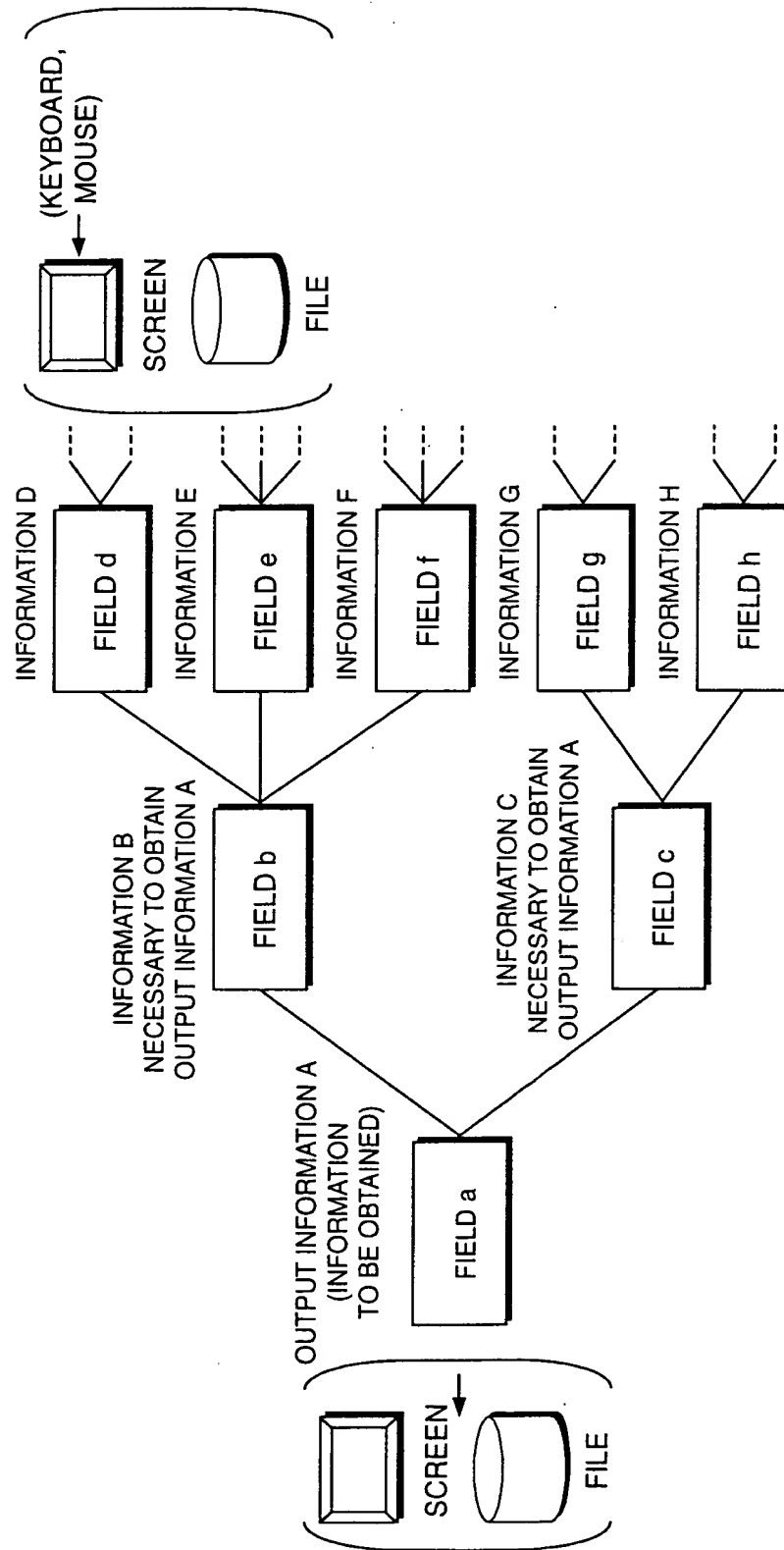


Fig. 6

Fig. 7

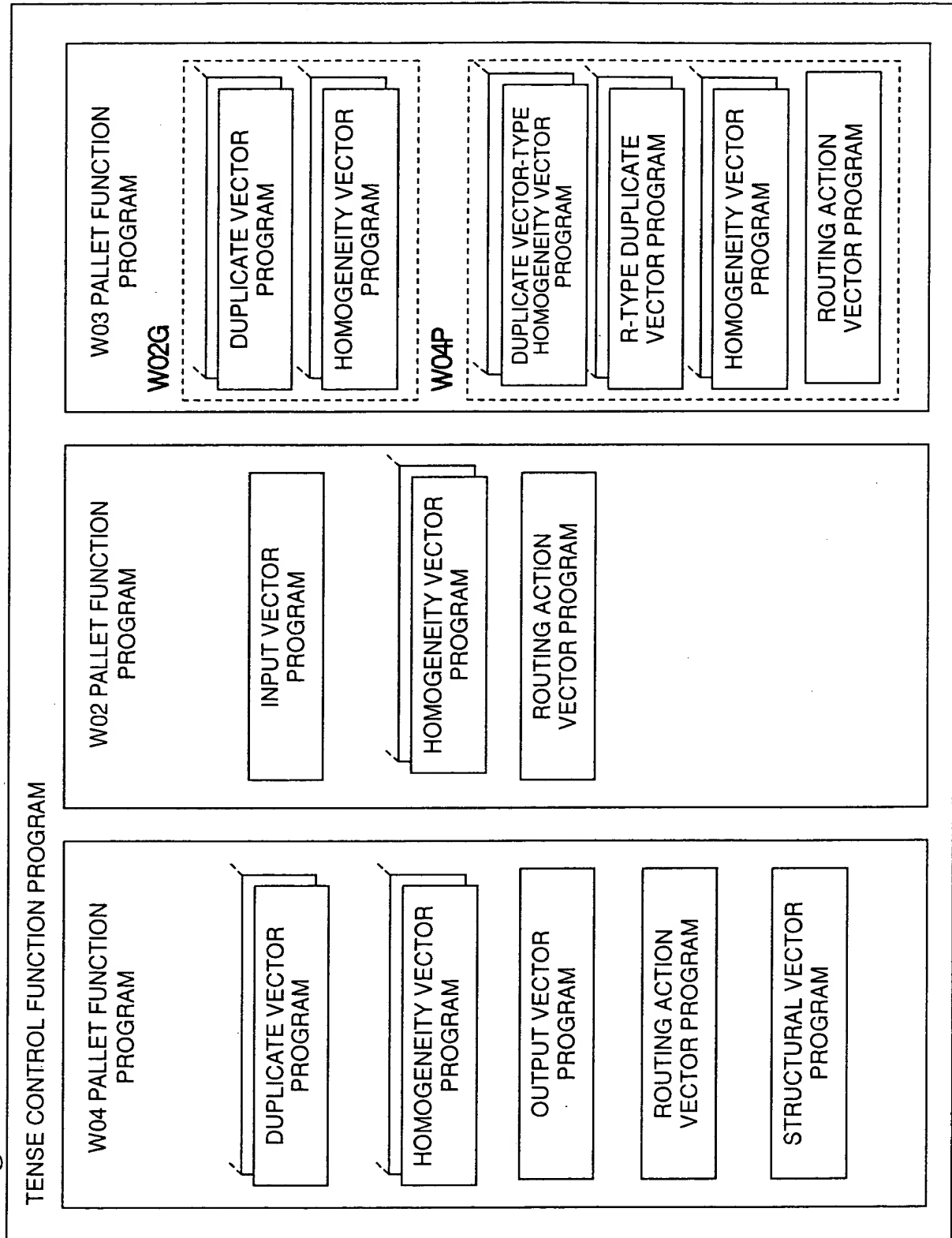
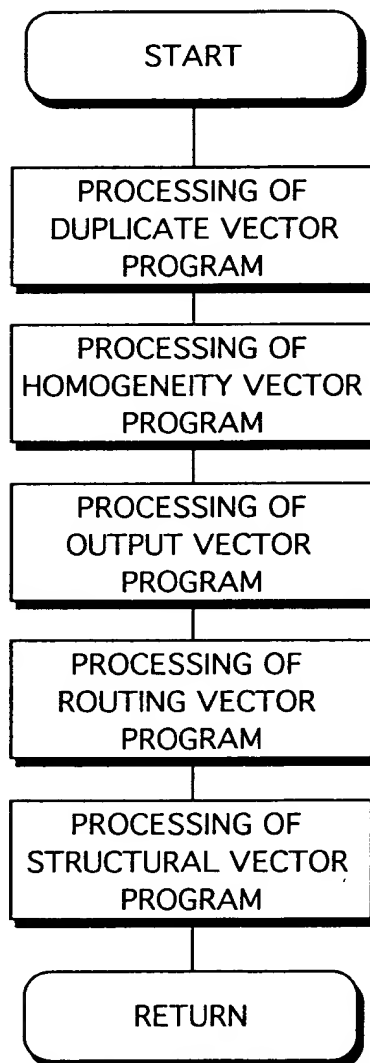


Fig. 8

W04 PALLET FUNCTION PROGRAM



1. The first part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = \int_0^x f(t) dt$. It is shown that $f(x)$ is a continuous function and that it satisfies the functional equation $f(x+y) = f(x) + f(y)$. The function $f(x)$ is also shown to be differentiable and its derivative is found to be $f'(x) = f(x)$.

W02 PALLET FUNCTION PROGRAM

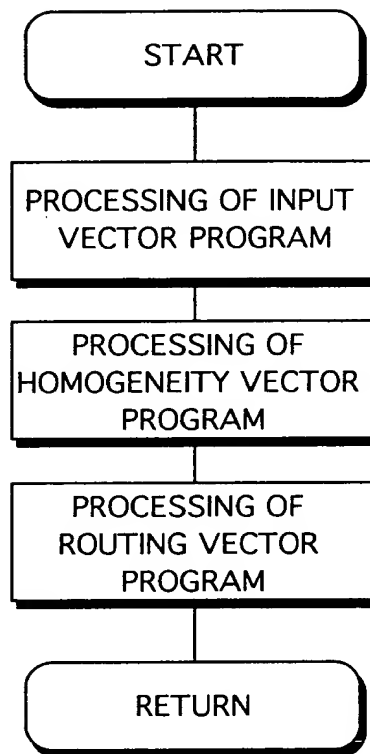


Fig. 10

W03 PALLET FUNCTION PROGRAM

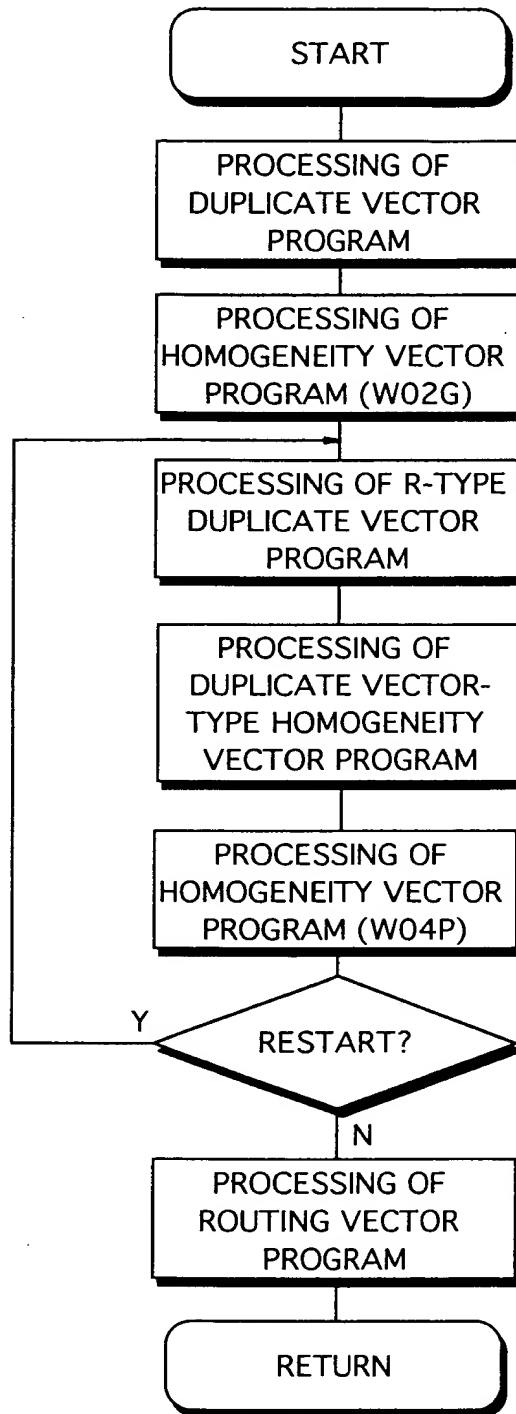


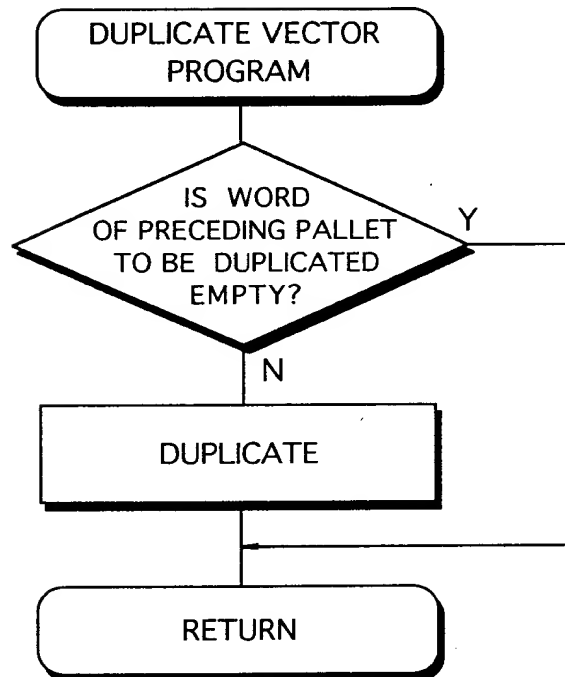
Fig. 11

Fig. 12

HOMOGENEITY VECTOR PROGRAM (W04)

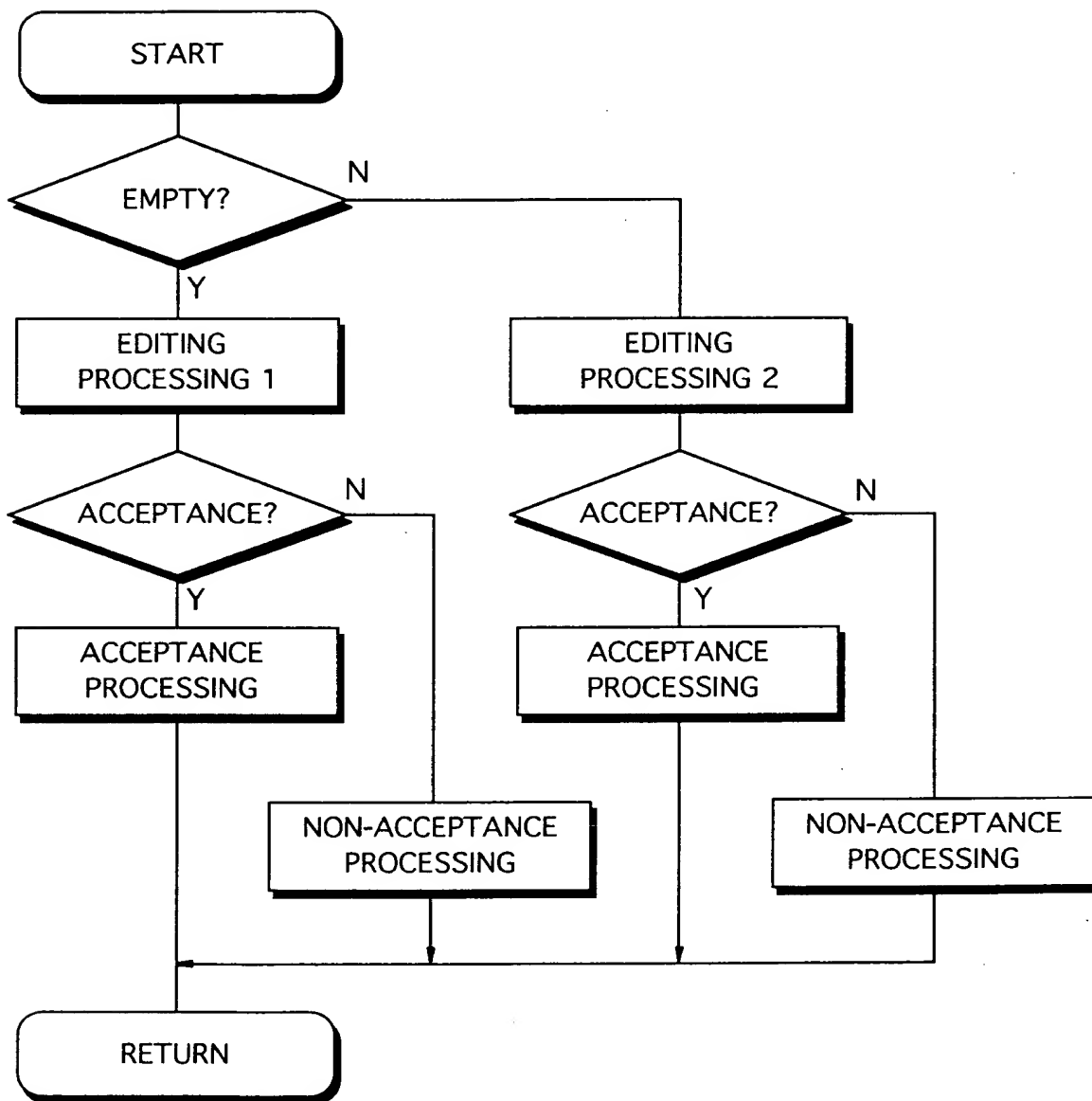


Fig. 13

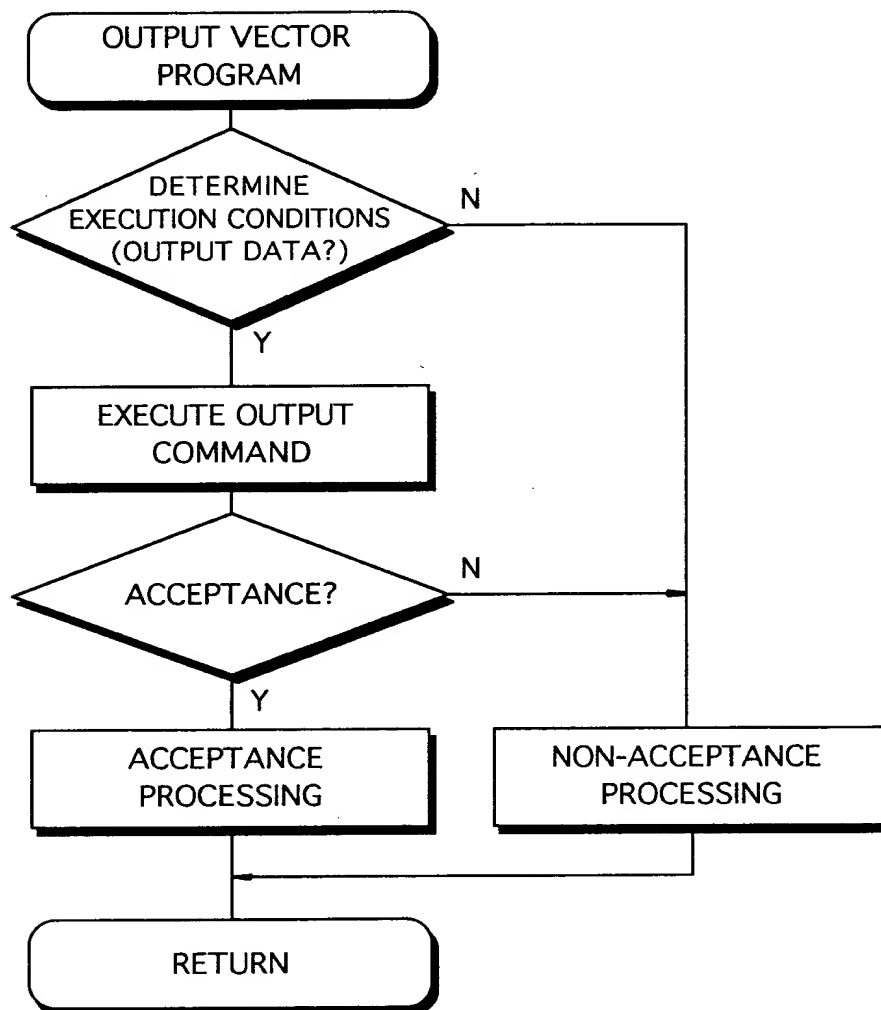
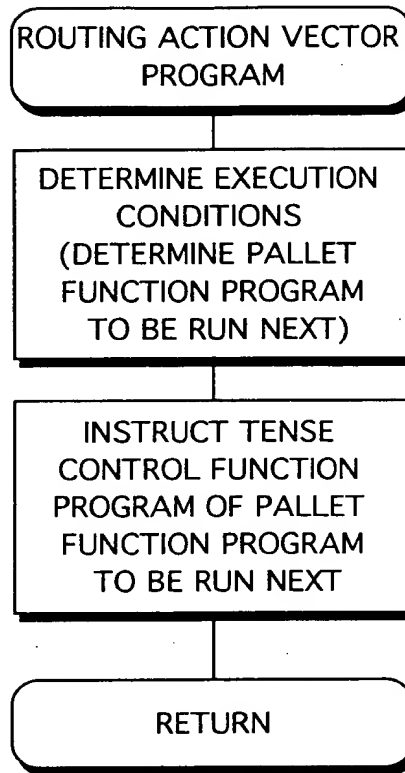


Fig. 14

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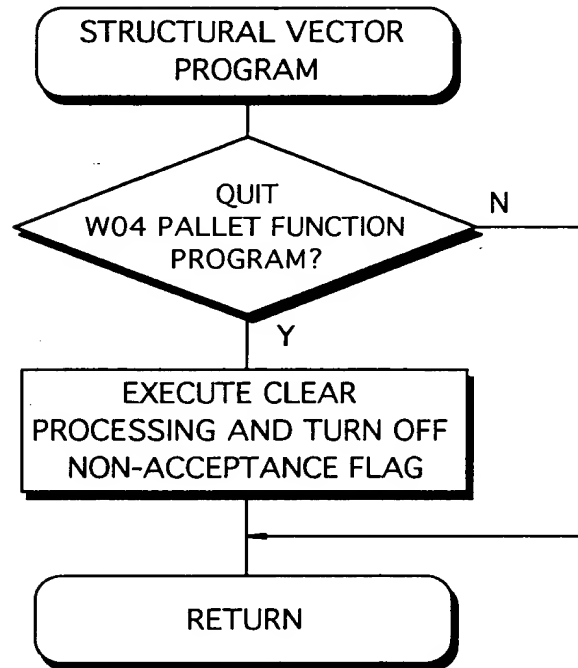
Fig. 15

Fig. 16

HOMOGENEITY VECTOR PROGRAM (W02)

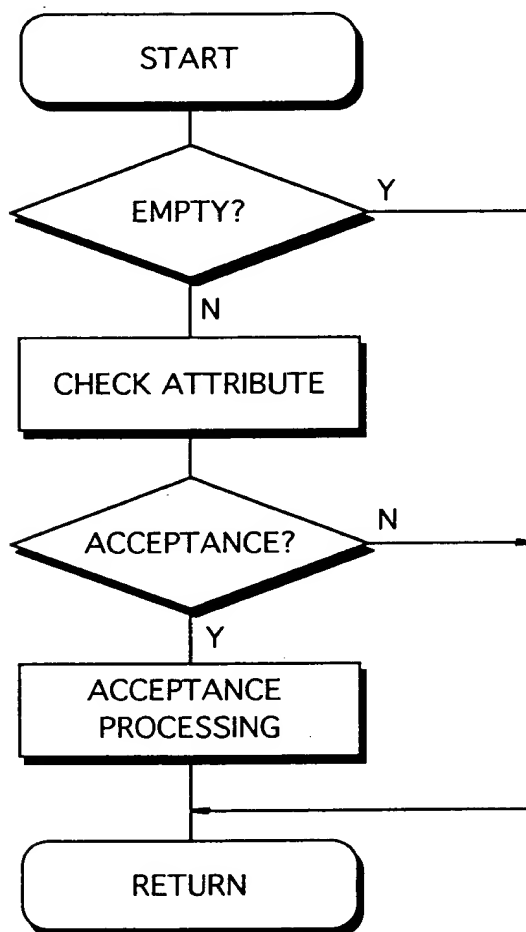
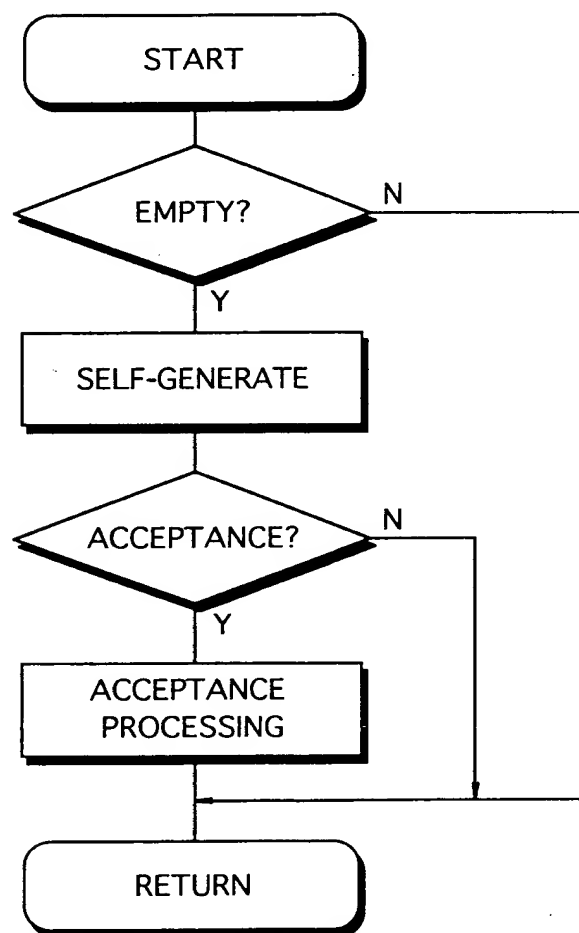


Fig. 17

HOMOGENEITY VECTOR PROGRAM (W02G)



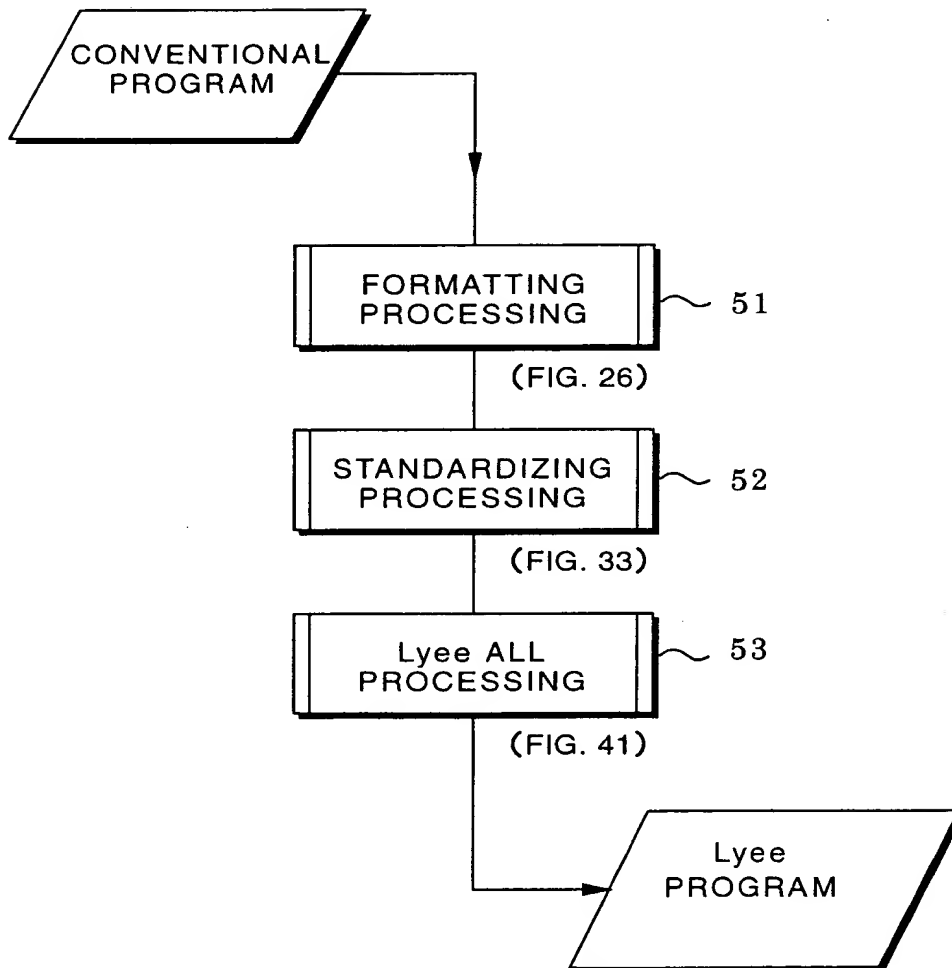
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Fig. 18

IF W02.□ = LOW-VALUE
GO TO EXIT.
END-IF
/*CHECK ATTRIBUTE
IF W02.□ = NUMERIC
GO TO EXIT.
END-IF
IF W02.□ NOT = LOW-VALUE
GO TO EXIT.
END-IF
W02.□ CNT = W02.□_CNT+1
IF W02.□_CNT < W02_RECALL_MAX
W02_RECALL_FLG = "1"
ELSE
W02.□_Non = "1"
END-IF

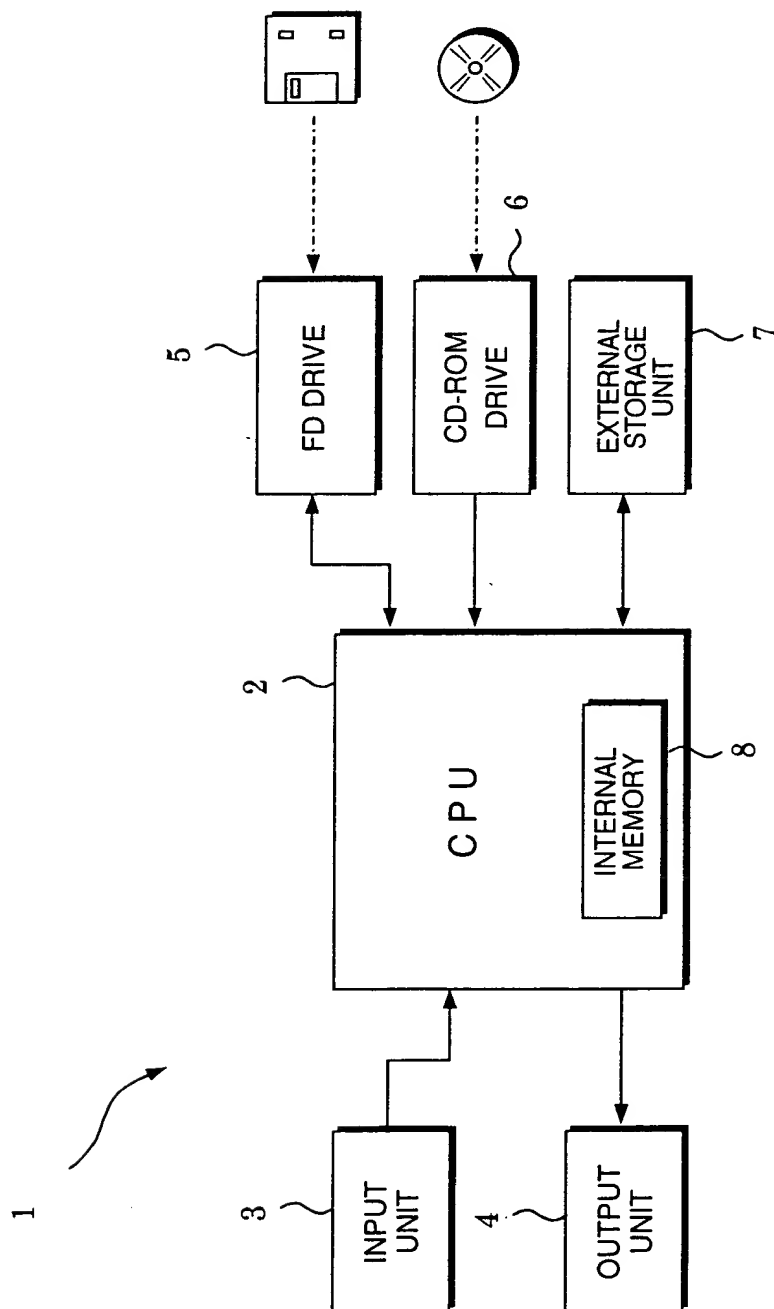
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Fig. 19

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Fig. 20



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Fig. 21

```

01  IDENTIFICATION DIVISION.
02  PROGRAMU-ID. AAA1.
03  ENVIRONMENT DIVISION.
04  CONFIGURATION SECTION.
05      SOURCE-COMPUTER. AS400.
06      OBJECT-COMPUTER. AS400.
07  INPUT-OUTPUT SECTION.
08  FILE-CONTROL.
09      SELECT GAMEN-F ASSIGN TO SCREEN-AAA.
10      ORGANIZATION IS TRANSACTION.

11  DATA DIVISION.
12  FILE SECTION.
13  FD GAMEN-F.
14      01 GAMEN-R.
15          03 SHIN-CD PIC X(05).
16          03 SU PIC S9(02).
17          03 TANKA PIC S9(05).
18          03 KINGAKU PIC S9(05).

19  WORKING-STORAGE SECTION.
20      01 SHIN-TBL.
21          03 SHIN-CD PIC X(05).
22          03 TANKA PIC S9(05).
23      01 END-BTN PIC X(01).
24      01 WK PIC S9(05).

01  PROCEDURE DIVISION.
02  MAIN-AA SECTION.
03  MAIN-START.
04      OPEN I-O GAMEN-F.
05      INITIALIZE GAMEN-R.
06      WRITE GAMEN-R.
07  LOOP-1.
08      READ GAMEN-F.
09      IF END-BTN = "1"
10          CLOSE GAMEN-F
11          GO TO MAIN-EXIT
12      END-IF.
13      IF SHIN-CD OF GAMEN-R = SPACE OR SU OF GAMEN-R = ZERO
14          MOVE 99999 TO KINGAKU OF GAMEN-R
15      ELSE
16          MOVE SHIN-CD OF GAMEN-R TO SHIN-CD OF SHIN-TBL
17          SELECT TEIKA FROM SHIN-DB INTO :SHIN-TBL TANKA
18          IF STATUS NOT = ZERO
19              MOVE 99999 TO TANKA OF GAMEN-R
20      ELSE
21          MOVE TANKA OF SHIN-TBL TO TANKA OF GAMEN-R
22          COMPUTE WK = TANKA OF GAMEN-R * SU OF GAMEN-R
23          IF WK > 10000
24              COMPUTE KINGAKU OF GAMEN-R = WK * 0.8
25          ELSE
26              COMPUTE KINGAKU OF GAMEN-R = WK * 0.9
27      END-IF
28  END-IF.
29  END-IF.
30  WRITE GAMEN-R.
31  GO TO LOOP-1.
32  MAIN-EXIT.
33  STOP RUN.

```

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Fig. 22

54

PRODUCT ORDERING SCREEN

<PRODUCT ORDERING SCREEN>

PRODUCT CODE

AAAAA

55

QUANTITY

20

56

UNIT PRICE

100

57

AMOUNT

2000

58

59

QUIT

FIG. 22

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Fig. 23

SHIN-TBL (PRODUCT TABLE)

SHIN-CD (PRODUCT CODE)	TANKA (UNIT PRICE)
AAAAA	100
BBBBB	200
CCCCC	300
DDDDD	400
EEEEE	500
⋮	⋮

60

T03020" 00000000

Fig. 24

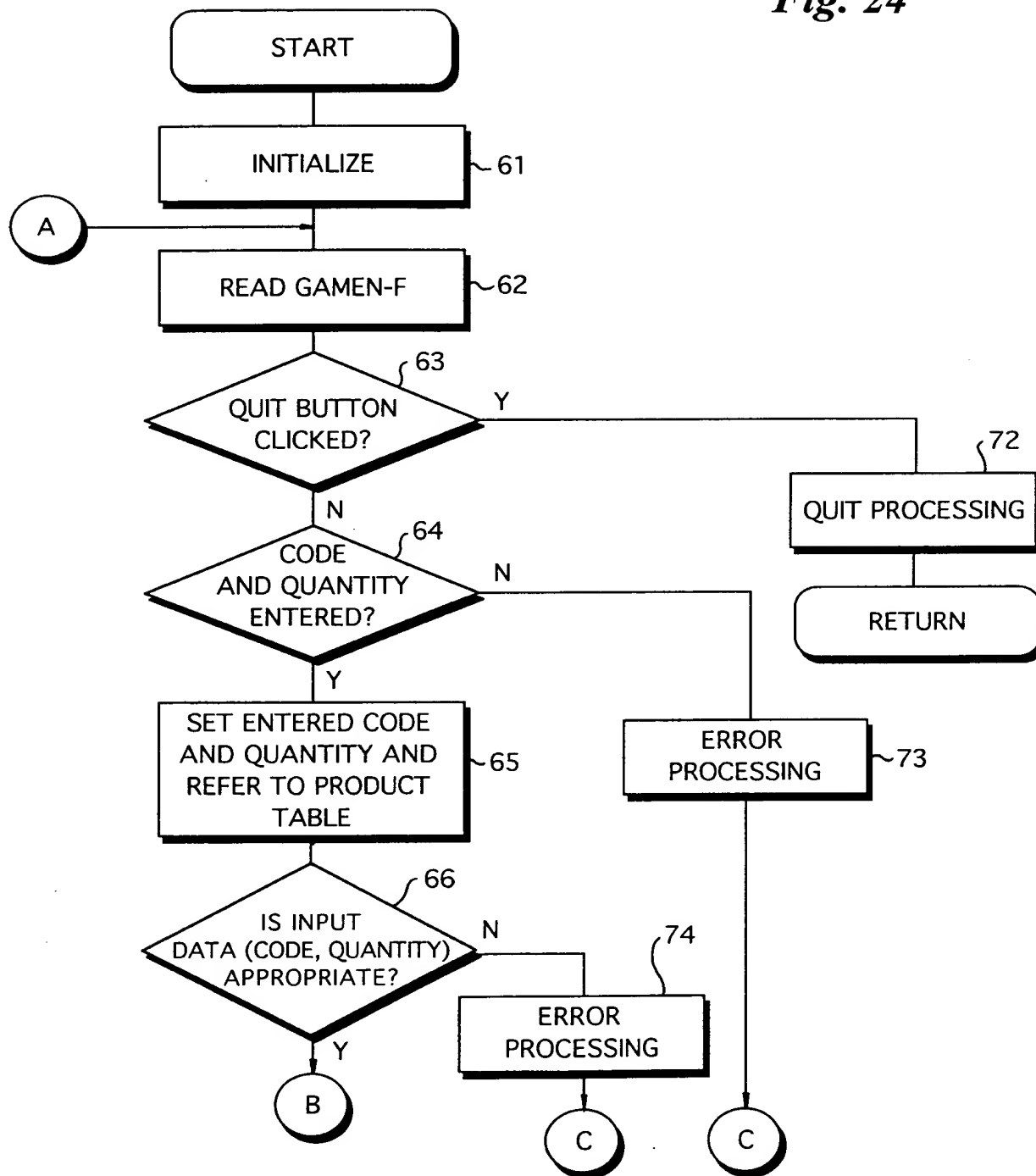


Fig. 25

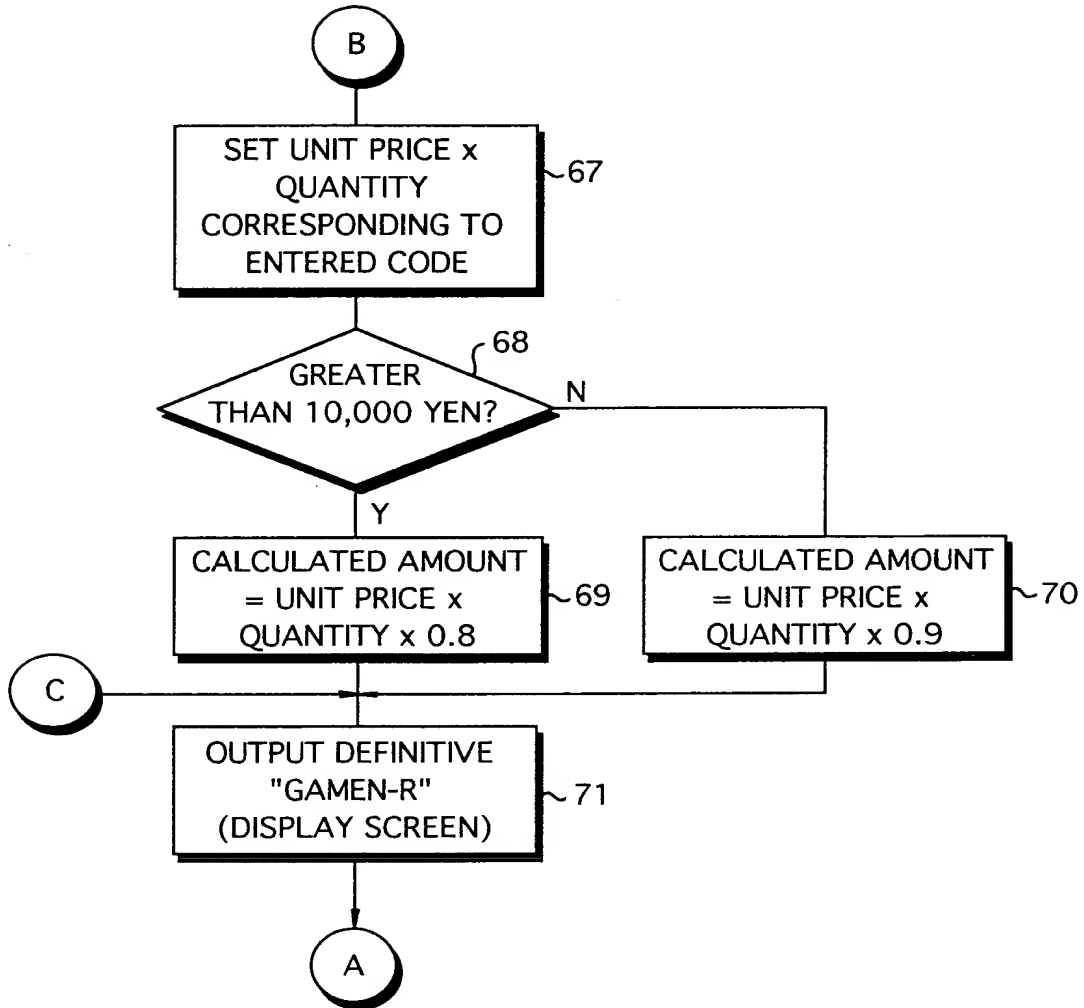
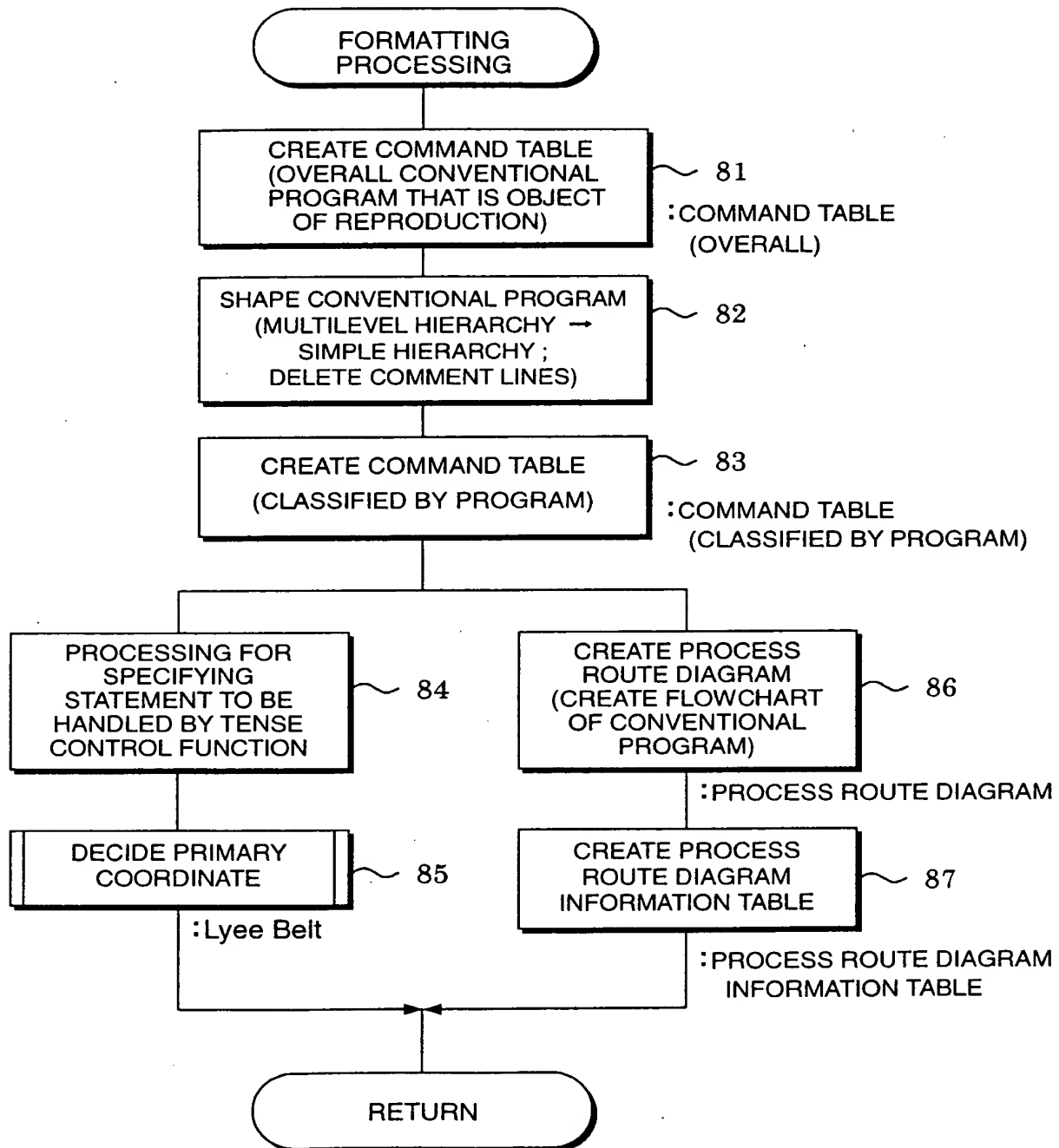


Fig. 26



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Fig. 27

COMMAND TABLE (OVERALL)

DEFINITIVE TYPE	COMMAND	COMMAND TYPE	CONDITION	INPUT/OUTPUT UNIT	INPUT/OUTPUT	PALLET LOCATION
SCREEN	SELECT	COBOL	ASSIGN TO SCREEN	ASSIGN CLAUSE FILE NAME	INPUT	T0W02
SCREEN	SELECT	COBOL	ASSIGN TO SCREEN	ASSIGN CLAUSE FILE NAME	OUTPUT	T0W04
DB	SELECT	COBOL	FROM	FROM CLAUSE DB NAME	INPUT	T1W02

105040" 00000000

Fig. 28

COMMAND TABLE (CLASSIFIED BY PROGRAM)

PROGRAM ID	COMMAND	INPUT/OUTPUT UNIT	DEFINITIVE	INPUT/OUTPUT	PALLET LOCATION
AAA1	READ	AAA	GAMEN-R	INPUT	TOW02
AAA1	WRITE	AAA	GAMEN-R	OUTPUT	TOW04
AAA1	SELECT	SHIN-DB	SHIN-TBL	INPUT	T1W02

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Fig. 29

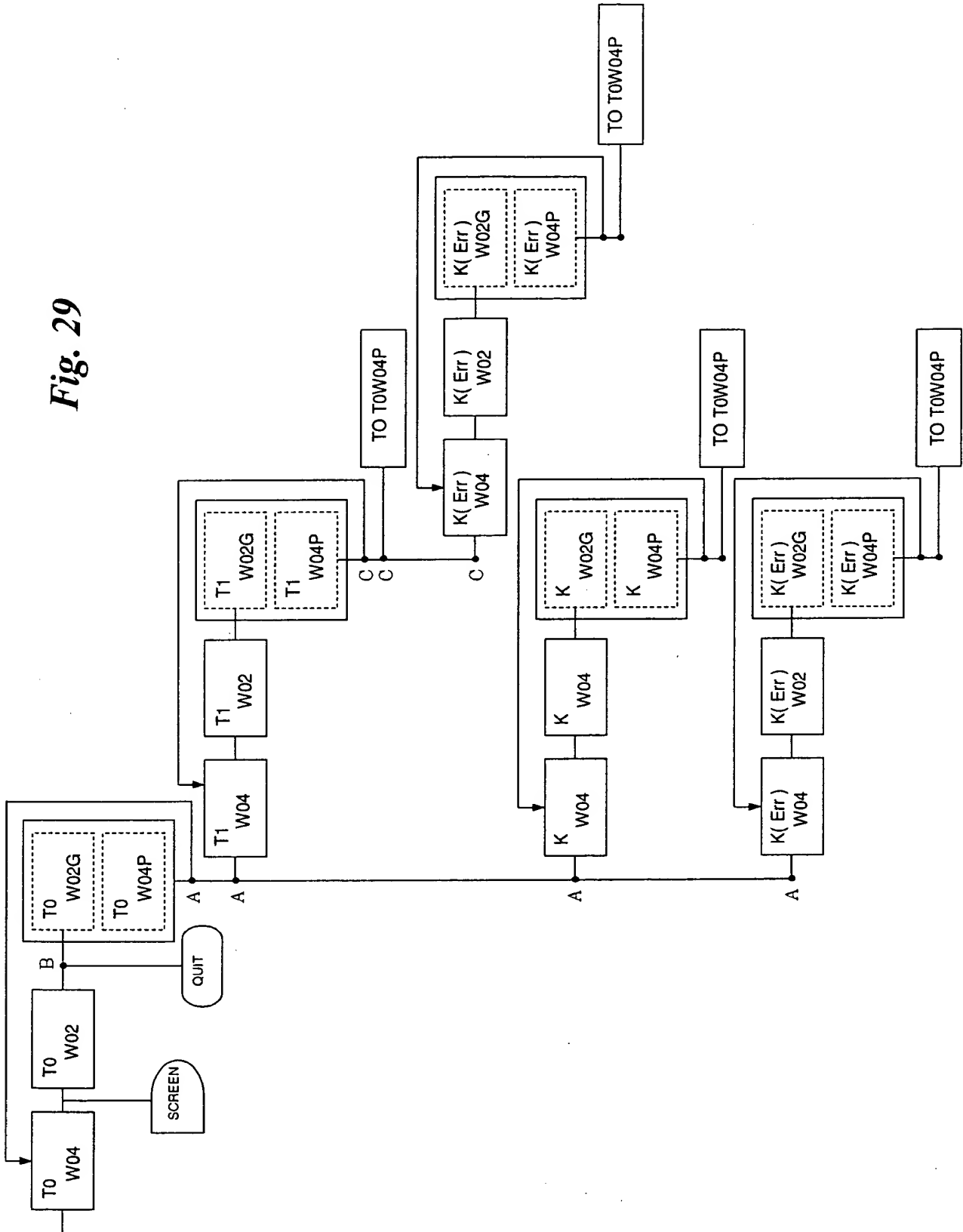
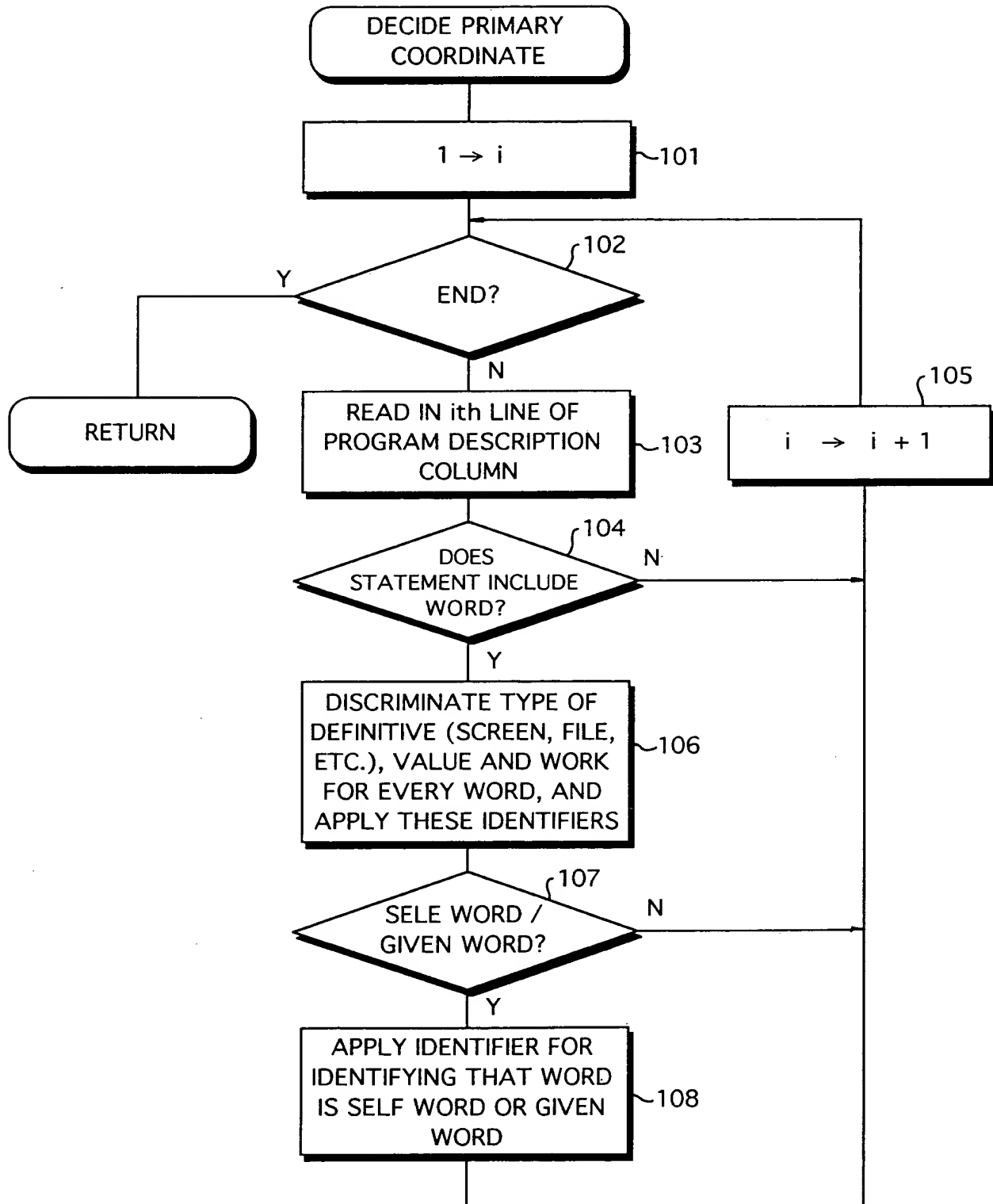


Fig. 30

PROCESS ROUTE DIAGRAM INFORMATION TABLE

PRESENT PGM ID	PROCESS ROUTE DIAGRAM ID	UNIT-TEAM FUNCTION ID	PALLET ID	ROUTING VECTOR ID	NEXT-PALLET ID	INPUT/OUTPUT COMMAND VECTOR ID	COMMAND	DEFINITIVE
A1	Sample1	Sample_1	A1T0W04	Route-1	A1T0W02	WRITE-1	WRITE	GAMEN-R
A1	Sample1	Sample_1	A1T0W02	Route-1	A1T0W03			
				Route-2	STOP			
A1	Sample1	Sample_1	A1T0W03	Route-1	A1T0W04		READ	GAMEN-R
				Route-2	A1T1W04			
				Route-3	A1K1W04			
				Route-4	A1E1W04			
A1	Sample2	Sample_2	A1T1W04	Route-1	A1T1W02			
A1	Sample2	Sample_2	A1T1W02	Route-1	A1T1W03			
A1	Sample2	Sample_2	A1T1W03	Route-1	A1T0W04P	READ-1	SELECT	SHIN-DB
				Route-2	A1E2W04			
A1	Sample3	Sample_3	A1K1W04	Route-1	A1K1W02			
A1	Sample3	Sample_3	A1K1W02	Route-1	A1K1W03			
A1	Sample3	Sample_3	A1K1W03	Route-1	A1T0W04P			
A1	Sample4	Sample_4	A1E1W04	Route-1	A1E1W02			
A1	Sample4	Sample_4	A1E1W02	Route-1	A1E1W03			
A1	Sample4	Sample_4	A1E1W03	Route-1	A1T0W04P			
A1	Sample5	Sample_5	A1E2W04	Route-1	A1E2W02			
A1	Sample5	Sample_5	A1E2W02	Route-1	A1E2W03			
A1	Sample5	Sample_5	A1E2W03	Route-1	A1T0W04P			

Fig. 31



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Fig. 32

LINE NUMBER	COMMAND TYPE	UNIT-TEAM FUNCTION	PROGRAM DESCRIPTION
01			PROCEDURE DIVISION.
02			MAIN-AA SECTION.
03			MAIN-START.
04		Φ	OPEN I-O GAMEN-F.
05		Φ	INITIALIZE GAMEN-R.
06		Φ	WRITE GAMEN-R.
07			LOOP-1.
08		Φ	READ GAMEN-F.
09	IF		IF END-BTN(SCREEN) = "1"(VALUE)
10		Φ	CLOSE GAMEN-F
11			GO TO MAIN-EXIT
12			END-IF.
13	IF		IF SHIN-CD OF GAMEN-R(SCREEN) = SPACE(VALUE) OR SU OF GAMEN-R(SCREEN) = ZERO(VALUE)
14	SELF COMMAND		MOVE 99999(GIVEN : VALUE) TO KINGAKU OF GAMEN-R(SELF : SCREEN)
15			ELSE
16	SELF COMMAND		MOVE SHIN-CD OF GAMEN-R(GIVEN : SCREEN) TO SHIN-CD OF SHIN-TBL(SELF : CONTROL BOX)
17	CMD		SELECT TEIKA FROM SHIN-DB INTO :SHIN-TBLTANKA
18	IF		IF STATUS(CONTROL BOX) NOT = ZERO(VALUE)
19	SELF COMMAND		MOVE 99999(SELF : VALUE) TO TANKA OF GAMEN-R(SELF : SCREEN)
20			ELSE
21	SELF COMMAND		MOVE TANKA OF SHIN-TBL(GIVEN:DB) TO TANKA OF GAMEN-R(SELF : SCREEN)
22	SELF COMMAND		COMPUTE WK(SELF : WORK)= TANKA OF GAMEN-R(GIVEN : SCREEN) * SU OF GAMEN-R(GIVEN : SCREEN)
23	IF		IF WK(WORK) > 10000(VALUE)
24	SELF COMMAND		COMPUTE KINGAKU OF GAMEN-R(SELF:SCREEN) = WK(GIVEN:WORK) * 0.8
25			ELSE
26			COMPUTE KINGAKU OF GAMEN-R(SELF:SCREEN) = WK(GIVEN:WORK) * 0.9
27			END-IF
28			END-IF
29			END-IF.
30		Φ	WRITE GAMEN-R.
31			GO TO LOOP-1.
32			MAIN-EXIT.
33			STOP RUN.

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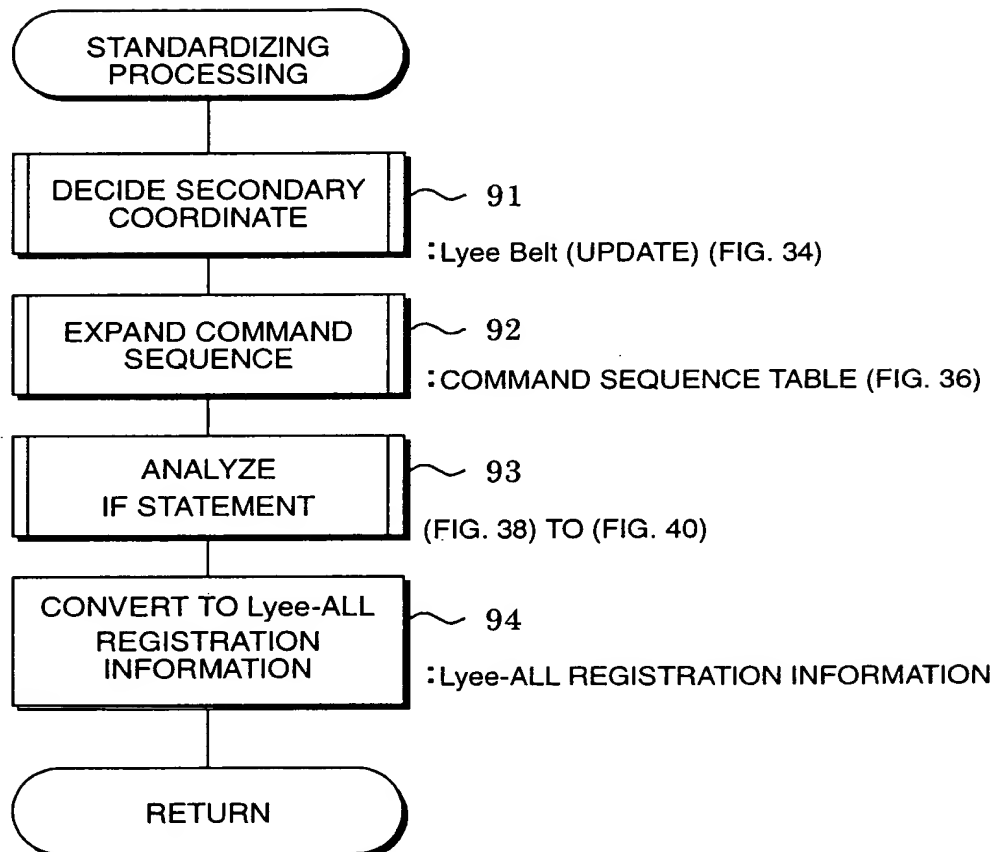
Fig. 33

Fig. 34

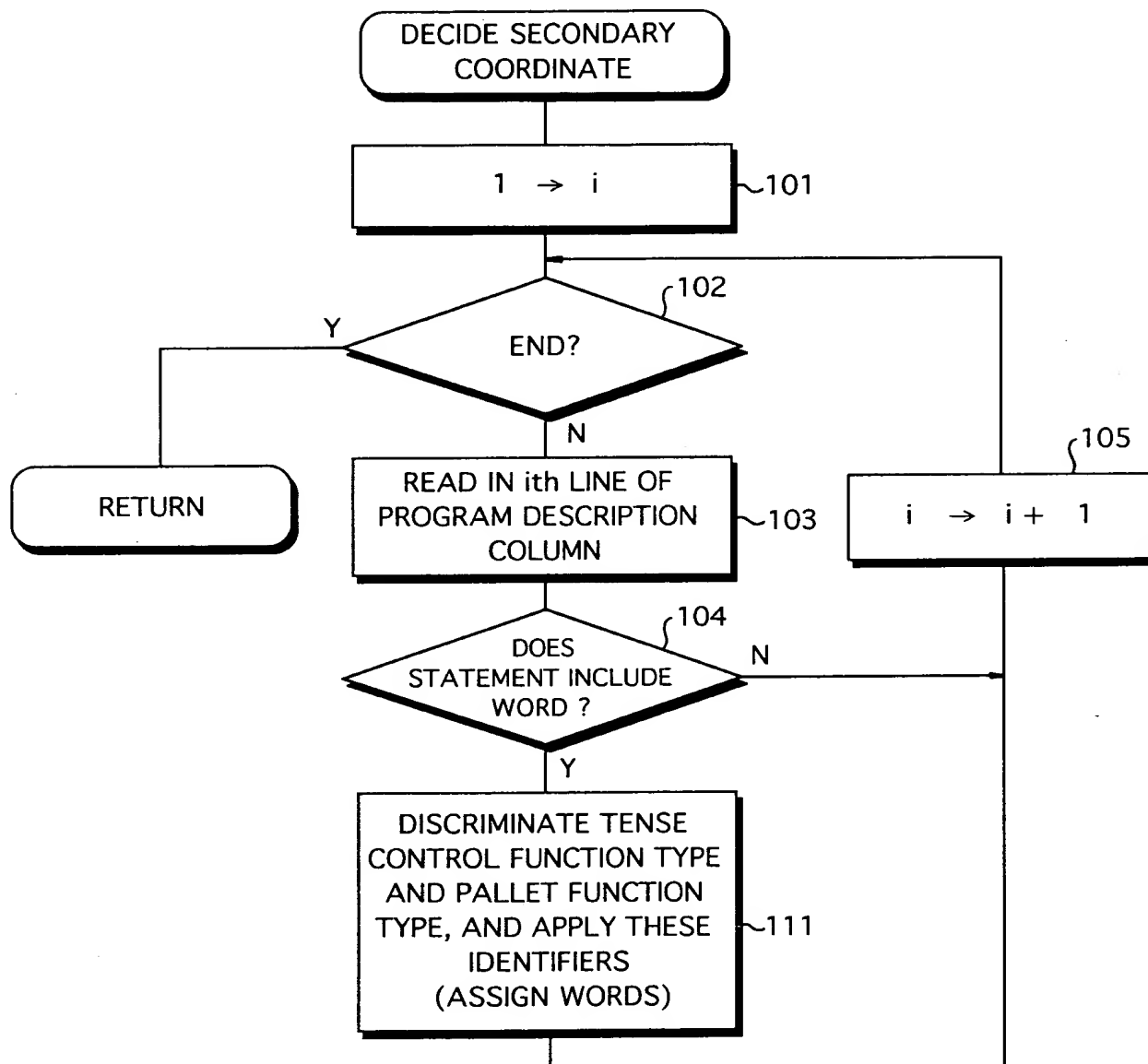


FIG. 34

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Fig. 35

LINE NUMBER	COMMAND TYPE	UNIT-TEAM FUNCTION	PROGRAM DESCRIPTION
01			PROCEDURE DIVISION.
02			MAIN-AA SECTION.
03			MAIN-START.
04		Φ	OPEN I-O GAMEN-F.
05		Φ	INITIALIZE GAMEN-R.
06		Φ	WRITE GAMEN-R.
07			LOOP-1:
08		Φ	READ GAMEN-F.
09	IF		IF END-BTN(T0W02) = "1"(VALUE)
10		Φ	CLOSE GAMEN-F
11			GO TO MAIN-EXIT
12			END-IF.
13	IF		IF SHIN-CD OF GAMEN-R(T0W02) = SPACE(VALUE)
14	SELF COMMAND		OR SU OF GAMEN-R(T0W02) = ZERO(VALUE)
15			MOVE 99999(GIVEN : VALUE) TO KINGAKU OF GAMEN-R(SELF:T0W04)
16	SELF COMMAND		ELSE
17	CMD		MOVE SHIN-CD OF GAMEN-R(GIVEN:T0W02)
18	IF		TO SHIN-CD OF SHIN-TBL (SELF:T1CB)
19	SELF COMMAND		SELECT TEIKA FROM SHIN-DB INTO :SHIN-TBL.TANKA
20			IF STATUS(T1CB) NOT = ZERO(VALUE)
21	SELF COMMAND		MOVE 99999(GIVEN:VALUE) TO TANKA OF GAMEN-R(SELF:T0W04)
22	SELF COMMAND		ELSE
23	IF		MOVE TANKA OF SHIN-TBL(GIVEN:T1W02)
24	SELF COMMAND		TO TANKA OF GAMEN-R(SELF:T0W04)
25			COMPUTE WK(SELF:KW04P)= TANKA OF GAMEN-R(GIVEN:T0W04)
26			* SU OF GAMEN-R(GIVEN:T0W02)
27			IF WK(KW04P) > 10000(VALUE)
28			COMPUTE KINGAKU OF GAMEN-R(SELF:T0W04) = WK(GIVEN:KW04P) * 0.8
29			ELSE
30			COMPUTE KINGAKU OF GAMEN-R(SELF:T0W04) = WK(GIVEN:KW04P) * 0.9
31			END-IF
32			END-IF
33		Φ	WRITE GAMEN-R.
			GO TO LOOP-1.
			MAIN-EXIT.
			STOP RUN.

00000000 00000000

Fig. 36

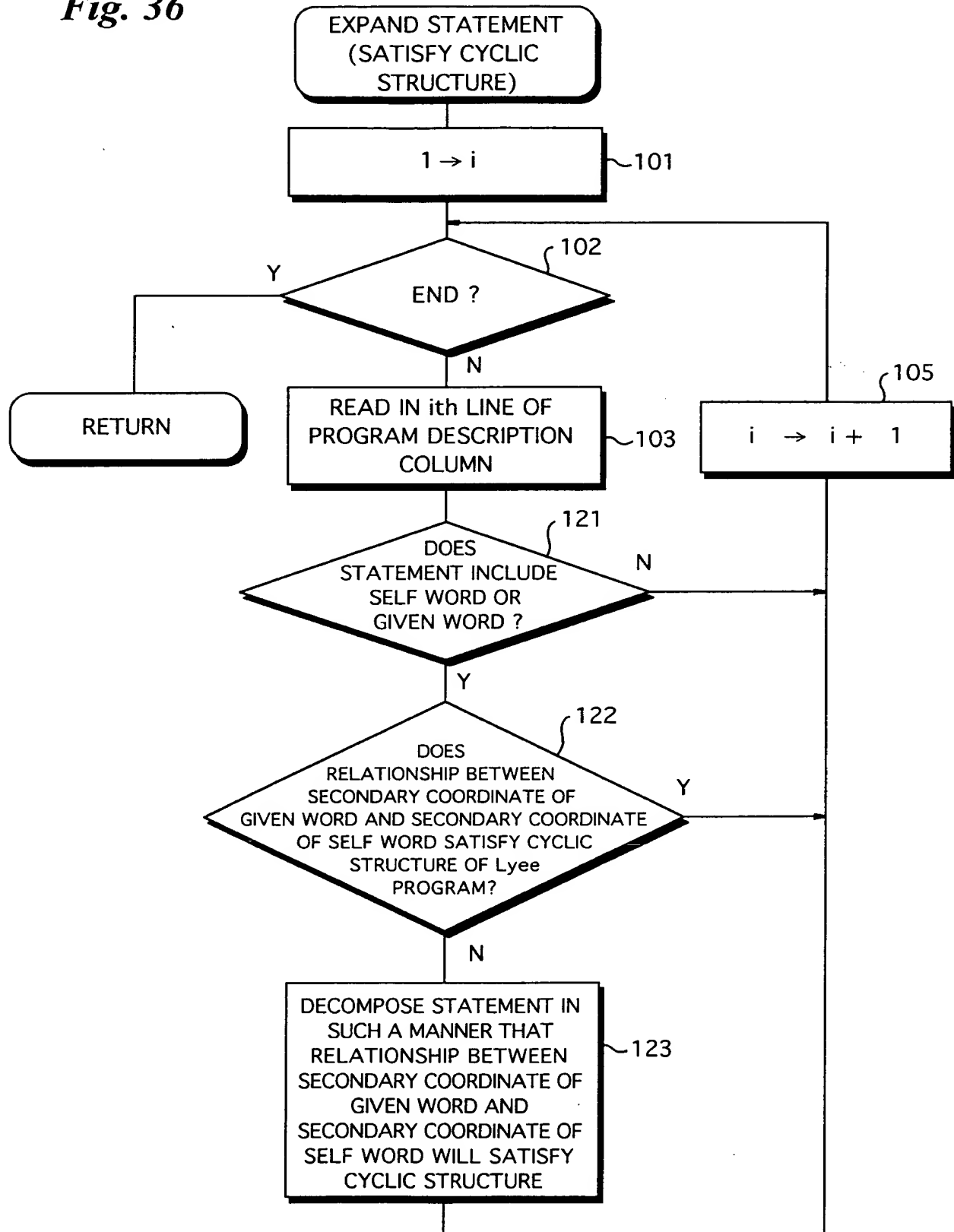


Fig. 37

COMMAND SEQUENCE TABLE

LINE NUMBER	TYPE	LOCATION	STATEMENT AFTER EXPANSION
21	DUPLICATE VECTOR	T1W02G	MOVE TANKA OF SHIN-TBL(T1W02) TO TANKA OF SHIN-TBL(T1W02G)
21	DUPLICATE VECTOR-TYPE HOMOGENEITY VECTOR	T1W04P	MOVE TANKA OF SHIN-TBL(T1W02G) TO TANKA OF SHIN-TBL(T1W04P BOUNDARY)
21	R-TYPE DUPLICATE VECTOR	T0W04P	MOVE TANKA OF SHIN-TBL(T1W04P BOUNDARY) TO TANKA OF SHIN-TBL(T0W04P BOUNDARY)
21	HOMOGENEITY VECTOR	T0W04P	MOVE TANKA OF SHIN-TBL(T0W04P BOUNDARY) MOVE TANKA TO TANKA OF GAMES-R(T0W04P)
21	DUPLICATE VECTOR	T0W04	MOVE TANKA OF GAMES-R(T0W04P) TO TANKA OF GAMES-R(T0W04)

Fig. 38

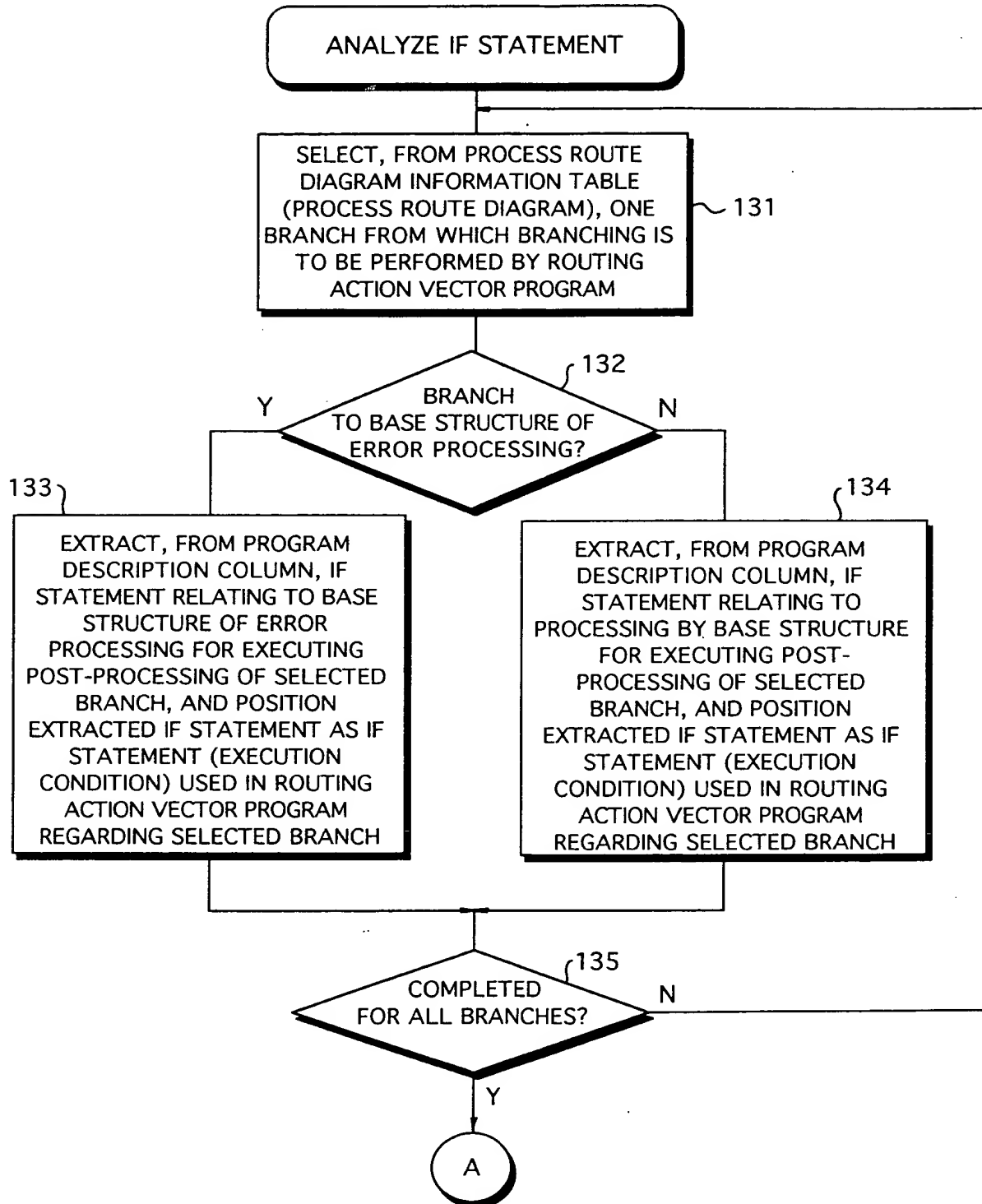


Fig. 39

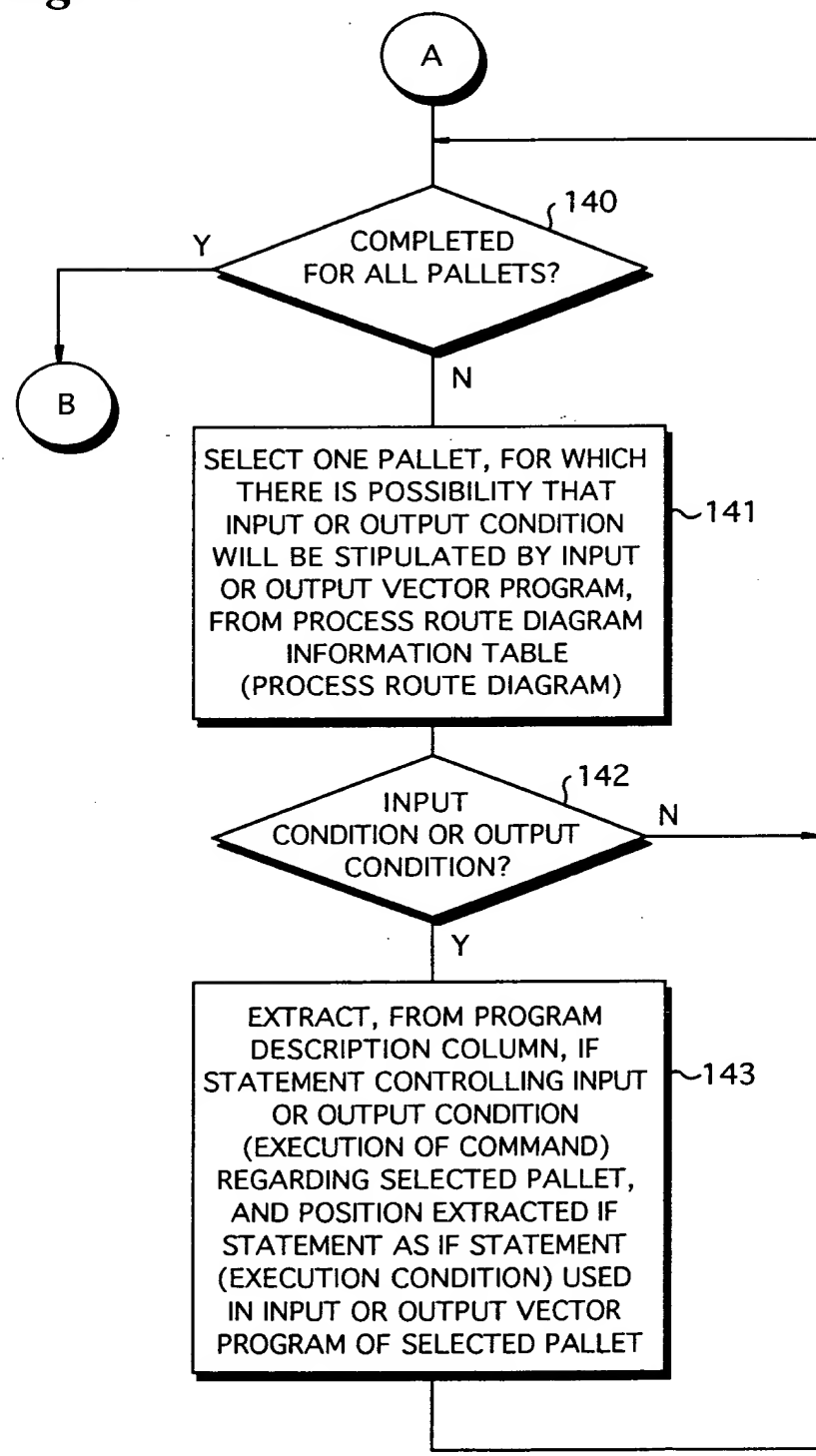
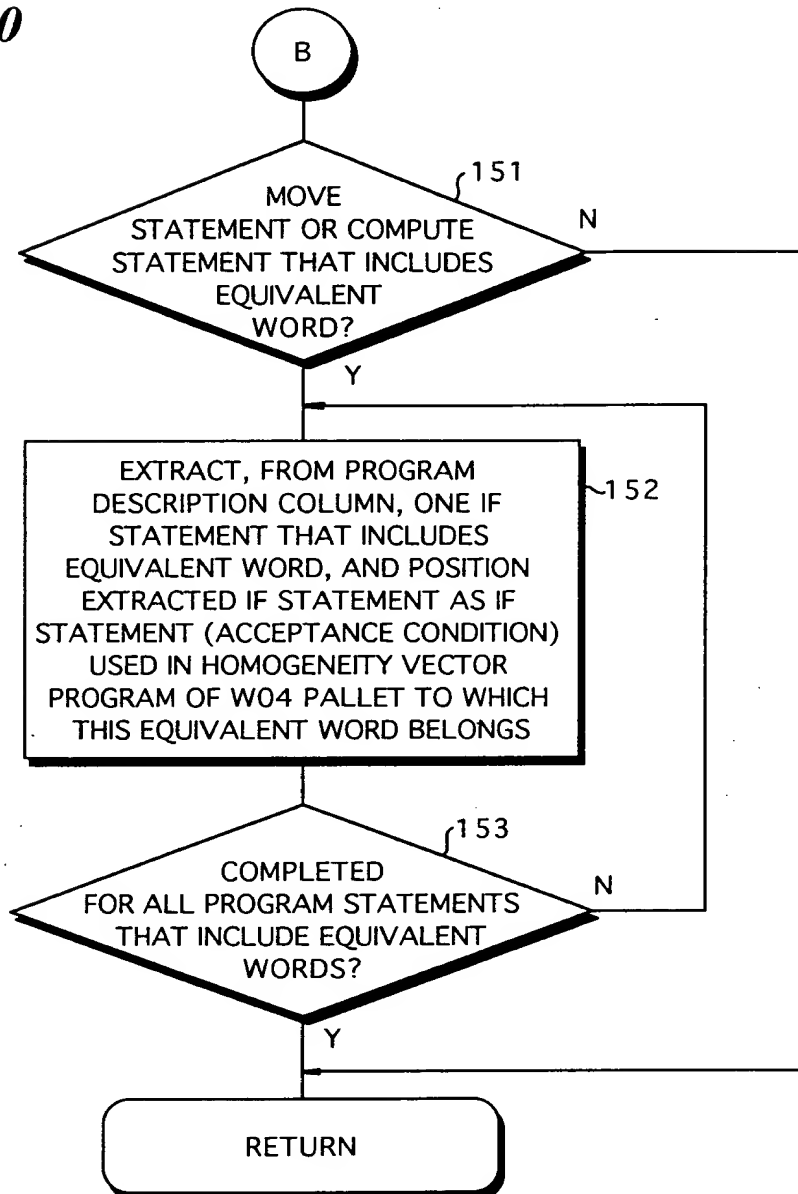


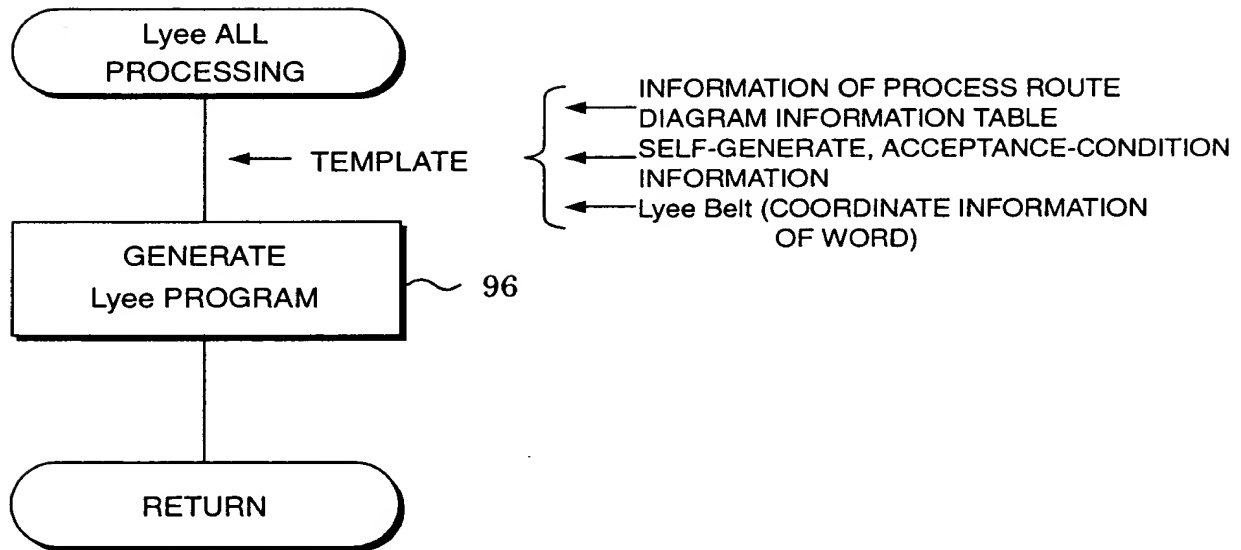
FIG. 39

Fig. 40



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Fig. 41



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Fig. 42

BEFORE EXPANSION

WORKING-STORAGE
SECTION.

COPY A.

01 B-DATA.
COPY B.

A PROC

01 A.

03 A1 PIC X(5).
03 A2 PIC X(10).

END

B PROC

03 B1

PIC X(3).

03 B2.

05 B3 PIC X(2).

05 B4 PIC X(5).

END

AFTER EXPANSION

WORKING-STORAGE
SECTION.

01 A.

03 A1 PIC X(5).

03 A2 PIC X(10).

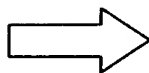
01 B-DATA.

03 B1 PIC X(3).

03 B2.

05 B3 PIC X(2).

05 B4 PIC X(5).



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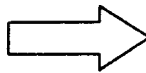
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Fig. 43

BEFORE EXPANSION

PROCEDURE	DIVISION.
MOVE A TO B.	
COPY X.	
MOVE C TO D.	

X PROC
IF B > 100
CALL'SUB001'USING B C
ELSE
CALL'SUB002'USING B C.
END

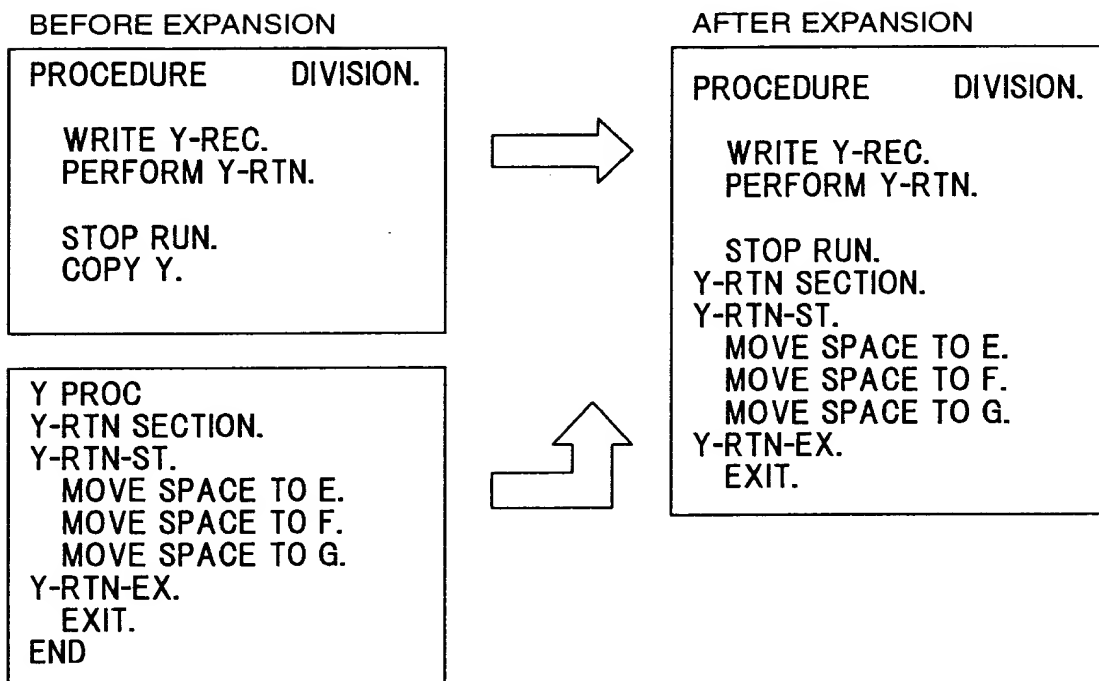


AFTER EXPANSION

PROCEDURE	DIVISION.
MOVE A TO B.	
IF B > 100	
CALL'SUB001'USING B C	
ELSE	
CALL'SUB002'USING B C.	
MOVE C TO D.	

135020" E6883860

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Fig. 44

T05020" E0003000

Fig. 45

BEFORE EXPANSION

MAIN PROGRAM

```

WORKING-STORAGE SECTION.
01 WK-A          PIC 9(10).
01 WK-B          PIC 9(10).
01 WK-C          PIC 9(10).
....
PROCEDURE         DIVISION.
:
MOVE A TO WK-A.
MOVE B TO WK-B.
CALL 'SUB001'
      USING WK-A WK-B WK-C.
MOVE WK-C TO C.
:

```

AFTER EXPANSION

MAIN PROGRAM

```

WORKING-STORAGE SECTION.
01 WK-A           PIC 9(10).
01 WK-B           PIC 9(10).
01 WK-C           PIC 9(10).
....
PROCEDURE          DIVISION.
:
:
MOVE A TO WK-A.
MOVE B TO WK-B.
WK-C=2 * WK-A * WK-B *
WK-B

MOVE WK-C TO C.
:

```

SUBROUTINE

```

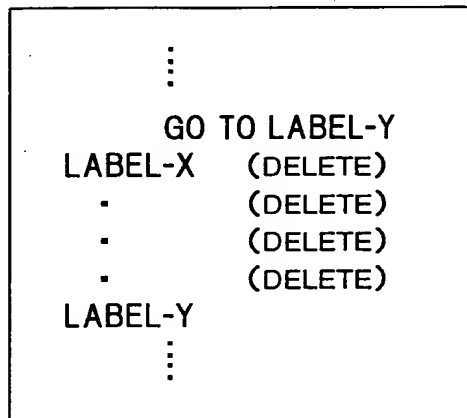
PROGRAM-ID.          SUB001.
    ....
LINKAGE SECTION.
01 WK-X              PIC 9(10).
01 WK-Y              PIC 9(10).
01 WK-Z              PIC 9(10).
PROCEDURE            DIVISION.
    USING WK-X WK-Y WK-Z.
PROC-RTN.            SECTION.
PROC-ST.

    COMPUTE
        WK-Z=2 * WK-X * WK-Y *
WK-Y
PROC-EX.
    EXIT PROGRAM.

```

1. The first group of people who are interested in the study of the history of the United States are the people who are interested in the history of the United States.

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Fig. 46

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Fig. 47

SET IDX TO 1 \Rightarrow MOVE 1 TO IDX

105020 FEB 88

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Fig. 48

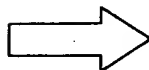
ORIGINAL COMMAND	AFTER SHAPING
MOVE A TO B,C ⇒	MOVE A TO B MOVE A TO C

T 0 5 0 2 0 " C 0 0 9 0 0 0

Fig. 49

ORIGINAL COMMAND

```
IF  A = B
  AND C = D
  IF  X = Y
    AND Z = W
    MOVE E TO
F  ELSE
  MOVE G TO H
```



AFTER SHAPING

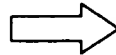
```
IF A = B AND C = D
IF X = Y AND Z = W
MOVE E TO F
ELSE
MOVE G TO H
END-IF
ELSE
END-IF
```

P. 0304.0 00000000

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*Fig. 50*BEFORE CONVERSION
TO SIMPLE HIERARCHY

```
IF A = B
  PERFORM S1
ELSE
  PERFORM S2
  ...
S1 SECTION
  CONTENT OF S1
EXIT
  ...
S2 SECTION
  CONTENT OF S2
EXIT
```

AFTER CONVERSION
TO SIMPLE HIERARCHY

```
IF A = B
  CONTENT OF S1
ELSE
  CONTENT OF S2
```